RESEARCH SUMMARY

forest sciences
NELSON FOREST REGION

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CASE STUDY:
Irregular Strip Shelterwood Cutting in a Viewscape

By Christine Clay

- **The objectives of protecting watershed values and visual quality were met. Irregular strip shelterwood harvesting was a feasible option in a constrained area.**
- **The success of innovative harvesting depends in part on using highly motivated workers who are involved in all aspects of block layout and harvesting.**

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INTRODUCTION

The need for more innovative harvesting methods in constrained areas such as viewscapes and/or watersheds is increasing in the Nelson Forest Region. This summary describes the prescription development, harvesting methods, and costs of one such innovative method.

In the winter of 1995, Atco Lumber Ltd. of Fruitvale, BC completed an irregular strip shelterwood harvest in an area of high visual sensitivity near Nelson, BC (Figure 1). The specific objectives of the harvesting operation were to:

1. Meet Visual Quality Objectives (VQO) for Retention.
2. Maintain water quality and quantity in Eagle Creek.
3. Deliver merchantable timber to the Atco Lumber Ltd. sawmill.

SITE DESCRIPTION

The site is located in the Eagle Creek Community Watershed on the Giveout Creek Forest Service Road south of Nelson, BC (Figure 1). It is in the Interior Cedar-Hemlock dry warm variant (ICH dw-01a). Soils are predominantly sandy loam, and slopes range from 45 to 60%. An even-aged mixed species stand (30% Cw, 30% Hw, 15% Fd, 6% Bg, 6% Pw, 5% Se, 5% Lw, 3% Pl), typical of the ICHdw, existed pre-harvest. The area is visible from Highway 3A along the Taghum, Corra Linn Dam, and Beasley corridor.

PRESCRIPTION DEVELOPMENT

Prior to harvesting, a Visual Landscape Inventory and a Visual Landscape Analysis were completed by the Kootenay Lake District of the Ministry of Forests. The inventory identified the visual values, and the analysis evaluated the interactions and trade-offs between visual and other objectives. This process also recommends Visual Quality Objectives (VQOs) that are considered to be acceptable levels of landscape alterations (BCMOF 1995a).

These analyses determined that this landscape is very sensitive to alteration and that the VQO should be "Retention". The objective of Retention is to ensure that forest management activities are not clearly visible. The goals are to avoid altering the line, form, colour, and texture of the unmodified landscape.

The two main factors contributing to the high sensitivity rating are: the high number of potential viewers from the highway, and the uniform texture of the forest on the slope. As well there are no natural openings, and there is no potential for colour change of foliage because the area contains primarily conifers of one age class. Only scattered light screening of the harvest area exists along the highway.

To meet the VQO of Retention, and to address the issue of high visual sensitivity, an irregular strip shelterwood harvesting method was used where clearcut strips were alternated with partial cut strips (MOF 1995b). The objective of the partial cutting was to remove all lodgepole pine, white pine, spruce, and other stems with defects. Defects were defined as: conks, heavily scarred, dead or broken tops, and mistletoe-infected larch.

The harvesting pattern (Figure 2) on the 18-ha block consists of 25 clearcut strips radiating like spokes of a wheel from each landing; each strip is 10 m wide, and 80 to 280 m long. On either side of each clearcut strip is a 10-m wide strip laid out for partial cutting (shelterwood) (Figure 3). The result is that clearcut strips angled across

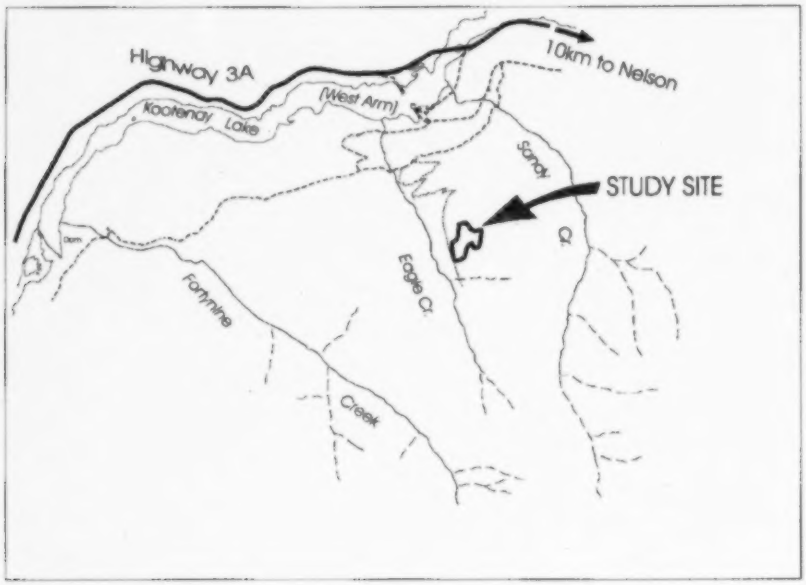

Figure 1. Location of the harvesting site.

the slope are hidden by the adjacent reserve trees (Figure 4). Irregular spacing between strips and a range in yarding distances occurred because of operational limitations such as poor deflection and stream locations.

The stand will be entered every 30 years to remove approximately 180 m^3/ha. In 30 years the reserve area will be partially cut, and the partial cut area will be clearcut. In 60 years the remaining partial cut area will be clearcut. In 90 years the cycle will begin again with harvesting in the initial clearcut area.

The key characteristic of the irregular shelterwood is that, although prompt regeneration is an objective, residual trees are left for longer periods, i.e. beyond the regeneration phase (BCMOF 1995b). The residual trees in this case are providing non-timber objectives of visual quality and watershed protection.

The site sensitivity hazard ratings in the block ranged from moderate for compaction, displacement, and mass wasting, to moderate-high for forest floor displacement and surface erosion.

HARVESTING OPERATIONS

Harvesting operations took place from October to December 1995; snow depth over this period ranged from 8 to 60 cm. Yarding was conducted by a Skagit SY 717 cable machine equipped with a Maki 2 carriage. A five-person crew—consisting of a chokerman, faller, yarder operator, loader/buckerman, and foreman/buckerman—worked a total of 30 days to remove 4254 m^3. From 100 to 120 m^3 (3.5 to 4 truck loads) were removed each day.

Faller selection was implemented in the partial cut areas. Prior to harvesting, a supervisor walked through the block with the faller and explained the harvesting objectives.

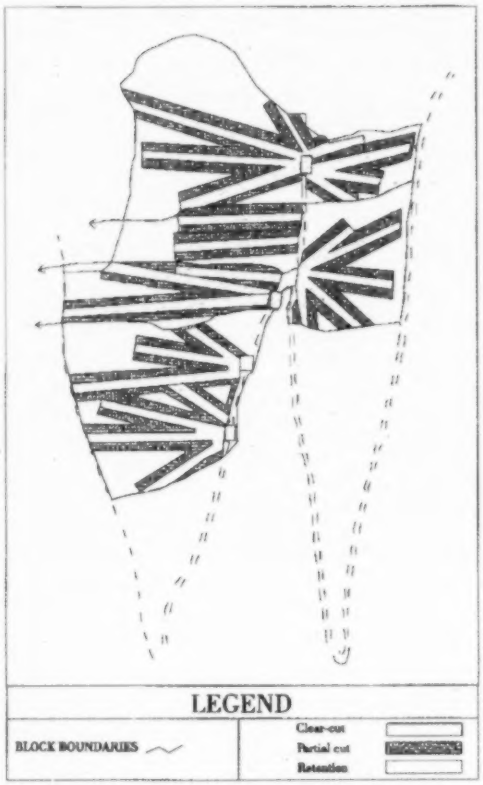

Figure 2. Harvesting pattern.

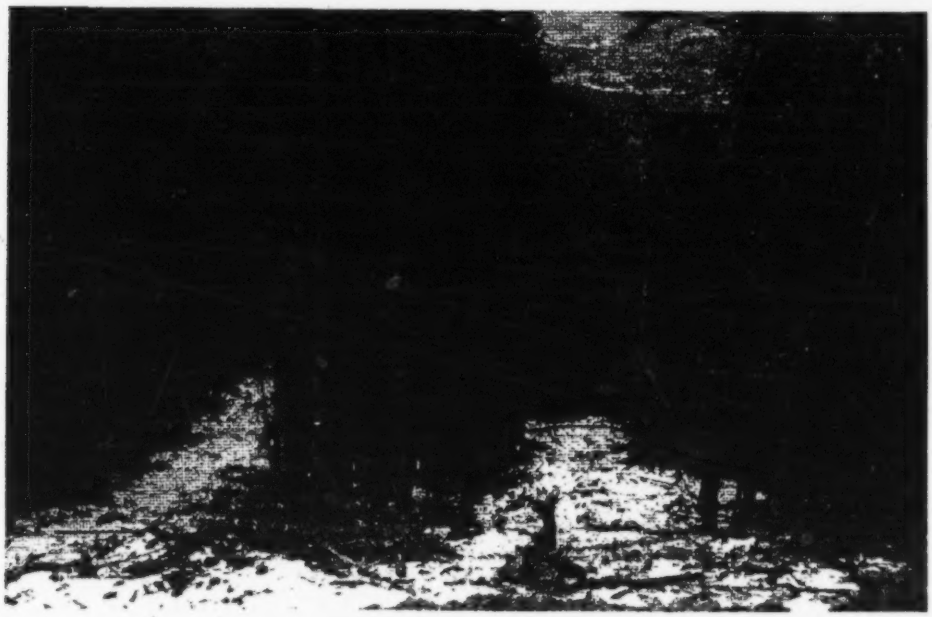

Figure 3. Clearcut strips alternating with partial cut and reserve strips.

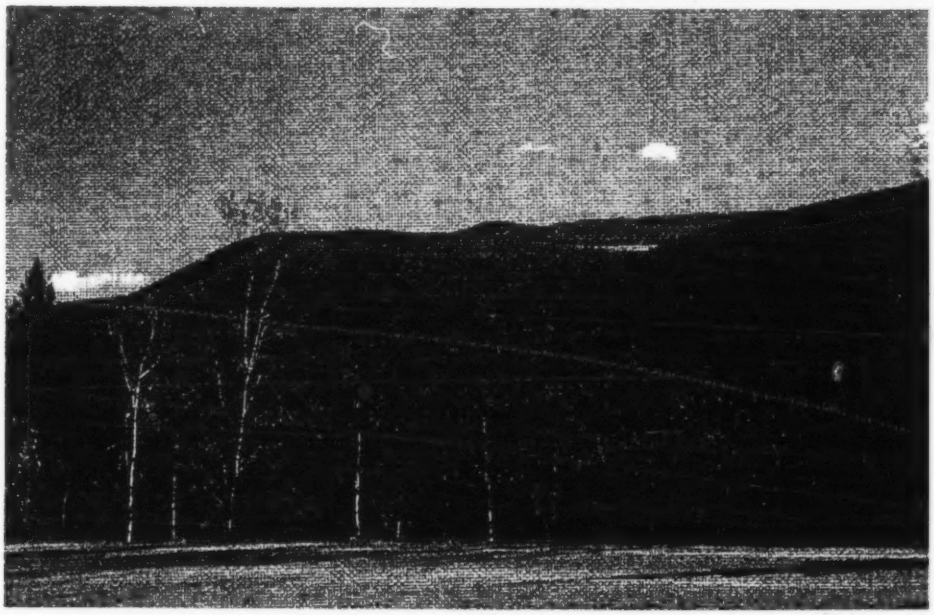

Figure 4. View of the harvesting block from the highway.

Ribbons marked the center of each yarding corridor, and the faller clearcut 5 m on either side of the centerline. Trees were directionally felled uphill (into the opening) in a herringbone pattern.

All landings were located on the roadside due to layout, felling, and yarding constraints. All yarding was uphill with the exception of the eight strips above the main road (Figure 2).

Damage occurred to trees on the edge of the block when the occasional log rolled downslope during yarding. Rub trees were used in a few of the corridors to prevent damage to residual trees; any rub trees scarred >25% of bole diameter were removed at the completion of harvesting. Overall, very little damage occurred to the residual trees.

Harvesting was monitored daily to ensure that most of the clearcut strips would not be visible. However, three of the strips that were oriented straight up and down the slope were visible from the highway after harvesting.

Harvesting costs were estimated to be about 20% higher for this strip shelterwood than if a clearcut operation had been undertaken on the same slope.

Good communications among the motivated crew, and good supervision, contributed to the overall success of the operation and to minimizing damage and costs.

SITE DISTURBANCE

Allowable counted disturbance was determined to be 10% pre-harvest, and only 1.3% occurred. Permanent access structures disturbed 7% of the site. More soil disturbance occurred on the steeper slopes where the yarding deflection was poor and the trees would drag on the ground. The removal of trees from these areas increased the soil disturbance, although some soil disturbance was desired to make planting easier.

REFORESTATION

It was difficult to save advanced regeneration in the clearcuts because of the narrow yarding corridors; much of it was destroyed. Some damage to advanced regeneration occurred in the partial cut areas due to falling and yarding across the slope; however, sufficient advanced regeneration was retained and will serve as future crop trees.

The clearcut strips were planted in the spring of 1996 with spruce and Douglas-fir PSB 415B stock. Some fill planting also occurred in larger openings in the partially cut strips. No mechanical site preparation was completed, so trees were planted through the slash. This resulted in about a 10% increase in planting costs, which was partially offset by not having to do site preparation. Retaining slash on the site may have other advantages, i.e. in terms of cost and improving seedling growth, in that it restricts competing vegetation.

SUMMARY

There is an increasing need for innovative landscape designs when harvesting in watersheds and highly visual areas. It is important to minimize the impact of harvesting and road construction on the visual landscape and Community Watersheds.

An irregular strip shelterwood was a feasible option in this constrained area, and Atco Lumber Ltd. successfully achieved the objectives of protecting watershed values and visual quality of the harvested area. Although more expensive than conventional clearcutting, costs would be expected to decline for both layout and harvesting phases with experience. The success of innovative harvesting depends on highly motivated loggers who are involved in all aspects of layout and harvesting.

REFERENCES

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